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Scientific and technical information - for short STI - is made by and for people. It is also one of the strategic resources on which modern society is based, and increasingly, that resource is becoming decisive in the industrialization process. The overflow of information that can be witnessed is a sign of the growth of the so called knowledge industries in the industrialized countries. The masses of STI which are stored in data bases flow freely over the borders in search for users.

The insight that knowledge taken in the widest sense is recognized as a productive force which depends on the ways it is generated, diffused, analyzed and evaluated, has not come to surface in the Third World countries. Contrary to the industrialized countries the policy makers of the less developed countries - the LDCs - seem to imagine that the STI stored in publicly available data banks differentiate between people's belonging to one nation or another. They have not realized the opportunities the new technology creates to cope with their immediate information needs by taking advantage of the information transparency of the industrial countries by using modern communication facilities that will work even from their remote locations.

Few of the LDCs realize that knowledge and STI could transpire out of libraries, information services, specialist groups or government advisers. Instead, librarians and information specialists usually have low status in the LDCs, and we will examine that. The low status label also sticks to the international experts on missions, even if such missions have been agreed upon and set up by a government and an intergovernmental organization, such as Unesco. When the findings of the expert are reported to Unesco, recommendations to the government are worked out in conjunction with the country representative. However, these recommendations seldom sensitize the policy makers in the same way as, for instance, the advice of vendors of hardware or equipment.

These observations made on several occasions in the LDCs give rise to thoughts about more efficient approaches to bridge the knowledge gap in dealing with the developing countries. That information activities should be regarded as a lower type of work calls for a review of the means of communicating the significance of information services.

The present message might be wrong. The traditional talk about libraries and information services as providers of scientific and technical information does not ring a bell in a ruler's mind. The expert may require an information support service to himself in order to be an effective adviser. We may, therefore, look back in time for some particular events that triggered the STI development, the introduction of the new technology and the rise of librarianship in our own countries.

Forecasting studies.

A striking feature in the LDCs is the short planning periods. Usually, we find three or five-year plans which more can be regarded as being of a fire-fighting nature than real plans for development. The priorities set on agricultural development, health services, literacy, industrialization, etc., give little room for an STI policy embracing research libraries and documentation centers.

In the industrialized countries the planning period is longer, and there have been a number of forecasts and projections to support the policy makers when it comes to STI development. We might recall the impact the Weinberg report made in 1963 both on the US Government and on many others. It certainly opened the policy makers' eyes about the importance of STI. Later on the OECD member countries were conditioned by the work done in its Information Policy Group - OECD/IPG - and all the studies and reviews made there. For instance, the Anderla Report "Information in 1985" was just one of many similar studies published about the information needs and the new tools and resources for filling these.

Especially noteworthy were the Delphi studies carried out in the 60's by Japan and Sweden. Even if the Delphi technique originally was designed to structure systematic interchanges among experts in order to produce the greatest possible convergence of minds in a consensual estimate, the repeated feedback also gave those policy makers who were involved a possibility to discover the prevailing trends in the forecasts. That made them biased to accept the forecasts as projections needed for their planning. Together with the Diebold study about the computer explosion, these Delphi studies gave the policy makers the opportunity to recognize a pattern which they wanted to see implemented by their planning.

It has to be remembered that the Anderla study had a time span of 15 years up to 1985. At the same time Japan made forecasts about the information society year 2000, far beyond the time horizon that usually is set by planners in the developing countries. At a seminar for politicians and high-level decision makers[1] the author carried out a Delphi study in Australia in 1973. A number of questions, taken out of the Japanese[2] and Swedish[3] studies concerning the future developments in the information handling field were considered by the participants. That study aroused much interest, especially when

the participants saw that they on the average put their time horizon well 10-15 years further into the future than their Japanese and Swedish counterparts. As an example can be mentioned the Australian prediction that a "nation-wide digital network for integrated information storage and retrieval" would be available around 1990, while the Japanese and Swedish estimates focused around 1983. Now we can notice that the forecasts have been overtaken by the events. Sweden had the SCANNET[4] operating in 1977, and the AUSINET[5] was a reality before the end of the 70's.

The Delphi study was meant to put the seminar participants into the situation of a decision maker who has to foresee in order to plan for actions. It also created an awareness among the participants about possible and alternative futures. Achievements such as AUSINET and SCANNET would not have come about if there had not been insights in government circles about what was necessary in order to fill the information needs and what was practically possible. The decision makers got on with the business at hand and took action to the benefit of their countries.

At a meeting in Kuala Lumpur in 1976, the author tried to create an awareness by arranging a Delphi study of similar nature among librarians. He had happened to reach a consensus among the decision makers and the librarians about the establishment of a telex network as a pilot project.[6] But nobody in the government circles believed in the Delphi technique, nor in such a subtle concept as "well-informed ignorance" which is a prerequisite for success. So the librarians who finally did the study put the time horizon well beyond their own retirement ages, not because they were not aware of that the technical events could happen, but because they knew about the slow decision making process they had encountered in the government when dealing with their problems.

Scenario writing

A government adviser would not do a good job if he did not make efforts to seek to transform a forecast from a piece of information proposed in a Delphi study into the decision making process of the government. One way of doing so is to confront the decision makers with a scenario that shows a future that is attractive. The difficulty is to write the scenario so it fits into the decision maker's own frame of reference. Many times the adviser lets his own frame of reference about possible futures take overhand and that often creates a serious knowledge gap.

In the policy maker's view a forecast or scenario is only useful when it helps him to arrive at a decision that maximizes his goals. The contribution of a forecast lies in how authoritative, attention-paying, and credible it is, and what service it offers to the country from the view of the policy maker's position, or as William Ascher[7] puts it, "forecasting serves as both 'intelligence' and 'promotion' for the policy maker".

Writing a scenario for a developing country may not be difficult, because events that already have happened in the developed countries may be natural ingredients. The problem is to overcome the additional effort needed to put the scenario into the framework of the country under study, to label it as a piece of "intelligence" so it may be accepted as a probable outcome of a course of action, if taken by a decision maker who wants "promotion".

The scenarios that have been drawn up for '1984 and beyond'[8] in the Western countries have dealt specificly with the growth of the knowledge industries. It is assumed that a country in the post-industrial stages of economic growth must have strength in its universities, research laboratories, libraries and information services. When this insight is transplanted into a scenario for a developing country, it is often ignored that the most important information to be taken into account is that which has been generated within the country itself. For that reason it seems difficult to talk about the need for library development, when the decision maker from first-hand knowledge finds that all the research results which have been produced endogenously, do not reflect a specific need for libraries.

If the STI production of a developing country has a national impact, even if its references to Western sources only deal with obsolete materials, how then identify the need for STI of more recent dates from foreign sources? How motivate information services as necessary for the development of the backward society?

A few of the OECD member countries were at such a stage a few decades ago. At that time OECD had finished a round of country reviews about their science policies. It seemed logical to do the same in the information policy field. Such reviews were undertaken in countries such as Canada, Federal Republic of Germany, Ireland[9], Spain and Switzerland. These reviews under the umbrella of OECD were of importance to create a deeper understanding about the STI problems and ways of solving them. In the interest of the country the authorities often produced background material and statistics on beforehand to the reviewers. When the review team was there, many questionable matters had already been straightened out.

Even if some of the developing countries have been scrutinized by review teams from the United Nations in the science policy field, that review method has hardly been used in the field of STI policy. There is a noticeable lack of fundamental statistics about various STI indicators in the developing countries. Thus, when an international expert meets his counterparts, he astonishes them by seemingly knowing more about their conditions than they do themselves. It is evident that on beforehand he tries to browse through pertinent books, articles, reports and other kind of information sources that easily can be retrieved in the industrialized countries, while the difficulties to get an overview in the country

itself is tremendous. For instance, by running around in various offices of Unesco or the United Nations Headquarter, it is possible to get a comprehensive view of a country by scanning the many reports from earlier missions in the same or neighbouring fields. That fact astonishes the local administrator who a priori believes that the outside expert is an ignorant.

From his gatherings the expert can include some salient features pertinent to the country in his scenario. That would infer that the expert has to his disposal an intelligence support system that the country would benefit from if the policy maker looked closer into the matter. However, as has been said above, such things as libraries and STI have low priority in the LDCs, and the importance of an information support function in the administrative quarters for better decision making is not recognized. It should be mentioned that in the mission to Malaysia[6], the telex network eventually materialized after heavy pushing and support from Unesco. However, soon afterwards a multinational computer company sold the government on a computerized management information system as a fashionable gadget for the decision makers in the upper levels of the government.[10] Presumably, the visibility of a big computer triggered that decision. Compared with the difficulties encountered to introduce the telex network between the most important research libraries, the decision to install a MIS in the government seemed trivial. In the following some conclusions from the above will be drawn.

The need for a new expert vocabulary

Encouraged by Unesco and the United Nations many of the developing countries are establishing infrastructures in the STI field that mimic the traditional pattern developed over the century in the industrialized countries. Thus, in many developing countries we are watching the establishment of old-fashioned libraries, documentation centers and archives, the hiring and training of traditional librarians, etc. However, the establishme nt of such an infrastructure is a lengthy process as we have experienced from the development in the industrialized countries. With regard to the time it takes to arrange such an infrastructure and to get it operational, it is astonishing that the developing countries, especially the LDCs, are buying these concepts, and do have patience to sit and wait for the information that might come out of it. They seem to ignore the potentials offered by the new technology of quick and comprehensive information transfer.

If time is important in the development process, the policy making and the organization al pattern to achieve changes in the provision of information must be reconsidered in light of the present trends. The installation of a telex in the very room of the university vice chancellor, instead at the switchboard or in the library is not an uncommon view in the LDCs. That shows that other status criteria are prevailing. To come to grip with the low status of libraries and librarians the government of India in the 50's recognized a

higher caste in the civil service, namely documentalists. That there is a normative barrier for librarians shows not only in salaries but also that government officials are not accustomed to accept ideas from librarians. A librarian is just a person putting up books on shelves or giving them out on loans, a sort of 'semi-profession' that furthermore, amongst its practitioners has a majority of women. In the eyes of the LDCs' administrat ors that immediately gives the profession a low status.

The policy makers cannot imagine that their aspiring ideas of a rapid social and industrial development by a better STI transfer could be linked to a profession that seems to be a natural occupation for women. They ignore that the profession has changed over the years. Earlier, librarians were in great esteem in the Western countries, and recently library work has got new dimensions. The policy makers of the LDCs seem never to have experienced the assistance given by scholarly librarians, nor their present day interaction with on-line services, and their screening competence on certain matters. The earlier subserviant attitude of the librarians, emphasized perhaps by the 'female touch'[11] that the policy maker might have experienced himself during his study years abroad, is nowadays confronted with the professional authority of a subject librarian who sits down with the user and on equal footing performs the interaction with the on-line data bases, not so much trying to make available what the user wants, but more what he needs.

If these administrators went back in history, they would observe that librarians often have served governments in a most efficient way. One of the richest nations, Denmark, had a ruler who with great success used librarians as intelligence officers. During the Napoleon wars he found out that his government and the Swedish one had taken opposite sides. As he did not know about the intentions of the Swedes and their troop movements, he felt the need for a few learned and intellectually well fitted men who in the disguise of scholars could uncover the information he so vitally needed, thus playing a game he had played with success at an earlier occasion. He chose three librarians at the Royal library who were tested on their intelligence competence to undertake the delicate task to go to Sweden and find out.[12]

After a few days in Sweden they could report on the intelligence matter to the King that he had nothing to fear from the Swedes. However, the Swedish intelligence[13] found out about the real purpose of their visit, but in view that they were scholars, they were expected to contribute more culturally to a good understanding between the two countries, than just to send trivial spy bulletins. Therefore, they were allowed to move around freely and contact influential people around Sweden. Both the Danish King's and the Swedes' judgements about them showed to be correct. Their contributions to increase the knowledge about the early history of the Scandinavian countries have had great cultural impact, so Sweden honoured them by memberships of the Royal Swedish Academy of Letters, History and Antiquities.

That example teaches us that librarians can serve as a most effective tool for what we can call political and scientific intelligence in a broad sense. The other thing to be observed is that these librarians had to travel as aliens into the foreign country to pick up the needed information. The new technology was not yet invented, so they could sit at their desks and find out about economic, political, scientific and technological informati on as their presentday colleagues can. These essential facts seem to be ignored by the decision makers of the developing countries.

The concept 'librarian' in the ears of the policy makers of the LDCs does not give the connotation to a profession that has the potentials to create a national knowledge resource to serve as a sort of intellect augmentation, or a 'brain-ware' as T. Kitagawa[14] calls it. Therefore, Unesco and we may be wrong in our approach, as a change in the apprehension of the profession in the LDCs is needed. To that comes the need for organizational changes if the establishment of a knowledge store is going to be an efficient vehicle for knowledge transfer.

That problem is not one solely for the LDCs. Recently the Executive Office of the President, Washington D.C., felt the need to install an information support system, and its protagonist Richard Harden[15] has indicated areas where the information processing techniques can be used in the LDCs to make executives and policy makers more information efficient. According to him the greatest potential probably lies in the rationally organizing of the information these individuals need to access, why he uses the concept 'personal information support services'.

Such forming of new concepts is not an isolated feature. William E. Colby,[16] earlier head of the CIA, has also stressed the necessity in the developing countries to train what he calls 'information industry cadres' : "The objective would be to leapfrog the development process in the same fashion that a satellite communications system can avoid the lengthy and costly process of developing land cables and wires throughout an underdeveloped country. In the same way the computer can replace legions of clerks in assembling, sorting and cumulating millions of facts, allowing the human talents of the clerks instead to seek higher education and more productive lives".

OECD that always has been in the forefront of concept forming, has also launched some concepts earlier found in the vocabulary of Steven Dedijer,[19] Lund University. At a OECD seminar in 1980 about the role of the knowledge industry and the intelligence function in development, the concept 'social intelligence' was picked out. According to Dedijer we can witness the rise of a social intelligence in all social systems, and it seems that time is ripe for the establishment of a social intelligence function for rulers. That concept is also found in the writings of Yehezkel Dror,[17] who talks about the concept 'a comprehensive strategic intelligence for rulers'.

The interesting thing is that Dror deals with the decision making process on the very top level. Librarians may learn much from that in order to improve their methods of approach. Also, it is significant to note that another social scientist, Frank T. Pearce,[18] has studied how to influence managers of organizations with a variety of size, fields and functions. In this endeavour he uses the concept 'management intelligence system'. We infer from these recent writings that any formulation of a general approach to the information transfer problem in the LDCs, and the use of the new technology, also needs a set of new concepts of the nature above, including forecasts and scenarios.

The organizational problem

A tool-kit of new concepts is only part of what is needed for a more action oriented thinking in the LDCs. As important is the organizational aspects whereby the concepts are transformed into decision making. As has already been said, one essential aspect is time. The building of libraries and documentation centres is example of temporally extended events. The rulers of the LDCs are conscious about the need to make fast progress in various fields. Time is for them a scarce resource. They cannot wait for the lengthy process of establishing an infrastructure of libraries, documentation centres and archives in order to get the knowledge store ready for development.

As the role of time is important in the development process, the policy making and the resulting organizational pattern to achieve changes must be reconsidered in the light of present day trends. There is a trend now that researchers, more than librarians are taking advantage of the increasing availability of information products which allow them to identify articles, conference papers, technical reports, etc. from their own terminals, without having access to a library collection. Furthermore, just by pressing a button they can receive by airmail from anywhere in the world the wanted documents. The DIALORDER of Lockheed DIALOG, the ASCAMATIC of Institute of Scientific Information are just examples which are supposed to be followed by more data base brokers. These services give the individual the opportunity to have new articles from a great variety of journals on his desk by airmail within a few days. Also, the open availability of cheap photocopies from hugh stores, such as the British Library Lending Division, acts in the same direction, namely to change the need for extensive library collections in the LDCs.

The state of affairs is worth considering when advising the counterparts in the LDCs. The problem is how to advice upon a development so the country does not close the doors to the future by too heavy investments in obsolete concepts. The experience shows that when administrators and librarians in the LDCs are confronted with the modern technology in practical demonstrations of its viability, it is believed to be too sophisticated on one hand, and on the other the decision makers only take into account the costs, thus, look upon it as something they cannot afford because of what they see as

heavy financial considerations spent on low status librarians. They do not relate it to the substantial budgets for buying books and journals, shelves or catalogue cards. When it comes to purchase a telex or a terminal, or to pay the bills for overseas calls, database royalties and airmail service the expert often faces a stone wall of ignorance and reluctance to pay.

Both policy makers and librarians in the LDCs, therefore, hesitate in front of the quantum leap they could achieve in the information provision by using the new technology, because of the immediate visibility of the cost of information. They seem unable to think in time as a resource and information as something you have to pay for. That is particularly obvious if you as expert try to find out about what recommendations have been made lately by advisers to the country. Looking through all reports and considering the recommendations given, is often a sad reading. Repetitions from report to report are numerous, but perhaps, unavoidable, since little action results. However, in some cases a country could have had an excellent 'social intelligence function' installed and paid for only from all the costs that these repeated missions have incurred during the years.

Why have all these recommendations by an intergovernmental organization such as Unesco to the governments not been taken up for consideration and resulted in action? That is a query linked to the state of undevelopment. First of all, the undeveloped pattern of agriculture, rural development, health services, literacy and education is demanding priority action of a 'fire-fighting' nature spoken of above. Therefore, such things as libraries and scientific information are given low priority both on national and local levels. The importance of an information support function in the administrative quarters for better decision making in all the above fields is not recognized, because the recommendations are not spelt out that way.

Another impeding factor is the ambiguities by which the experts often express themselves on matters about information transfer by terminals and the new technology. Even in such an excellent study as that by J.H.d'Olier, Documentation, libraries and archives, published by Unesco in 1975, such ambiguity is shown, namely: "Modern information methods are often too sophisticated to be used without modification to meet the needs of universities, of the public and even of the technicians". A policy maker gets the impression that he better conforms with Western traditions and proposes the establishment of libraries, whereby he can choose the size and the costs according to elaborated formulas without questioning the rational behind and the change of time. By keeping to the mainstream of the information flow to society, he does not even question if he may block the road to an alternative development that will come rather rapidly. Whilst nobody can disclaim the merits of building traditional libraries one must question the wisdom of that strategy if time and resourcs are taken into account.

Another questionable approach was brought forward at the UNCSTD meeting in 1979 when the developing countries demanded a new 'Global Information Network' which would facilitate the transfer of scientific and technological information to the Third World. As Ziauddin Sardar[20] points out, such a network demand is irrelevant because much of the information the developing countries seek can be retrieved in many countries around the world simply by using a small portable computer terminal and the telephone network on dial-up basis.

It is obvious that the development of an information capability is an endogenous matter. A nation has to set it up to meet its own intelligence needs, and the only important matter is how to go about and not block the road to the future. An interesting example is the development of an intelligence function in the field of energy and mining that has taken place within a ministry of a developing country, Venezuela. It has to be noticed that the function is located near the top-level echelon of the government.[21] By allocating the library function near the minister, the status level of the librarian is high.

The tasks carried out in the ministry ranges from trade pact negotiations, foreign aid transactions, licence purchasing, major systems purchases, hiring of consultants and their utilization, national equity agreements, catastrophies and disaster alleviation agreements, state and privately owned enterprises, foreign technology transfer, domestic technology transfer, joint ventures and cooperative endeavours technology transfer, in all, activities where ignorance can be costly or disastrous for the economy. The use of on-line communication to overseas data bases is a routine matter.

To strengthen the information capability, several information analysis centers and service units have been set up at divisional and sectional levels within the hierarchial structure of the ministry. Together with the central library and the computer center they form an internal information network primarily to support the information requirements of the ministry. The analysis centers are important as serving the 'intelligence function',[22] and by their work forecasting and planning are made on more firm information basis. Like the Danish King, mentioned earlier, the minister has chosen the librarian as manager for this important activity.

If more ministerial networks were set up by a government, we could talk about the establishment of a social intelligence function for development. Such a function in one country could be given the opportunity to work with similar setups in other developing countries. Many of the LDCs would benefit from pooling their resources on a regional basis in order to avoid the necessity of duplication in the national systems. A sharing of experiences in the social intelligence field might also shed light on problems and alternative strategies to cope with the development problems.

The challenge for the information experts who are serving as consultants in the LDCs, is to create an awareness about the new technology and its potentials. It can be foreseen that satellite communications and full document delivery by broadband communication worldwide will come rapidly. The developing countries will one day be involved in it. The message to convey to the rulers is to be more alert to these new trends than to set up infrastructures of conventional kind. There is not much in the books of Unesco about that, nor in its guidelines, so perhaps, Unesco should be given the advice first.

Conclusions

The conclusion is that in our talks with the LDCs we need to use a new vocabulary in order to introduce new concepts, such as a 'social intelligence function', i.e. a capability to tap and analyze the world's knowledge repositories for policy making. The American and the Venezuelan examples above show that the organization of such a function should take place in the government or in the ministries by utilizing librarians and the new technology in order to access information of importance to policy makers. Many young librarians and subject specialists should be trained to form the 'information industry cadres' that the LDCs are so short of.

The learning process for utilizing terminal communications is extremely short, and the cost/benefits can easily be assessed when such a new way of acquiring knowledge is started up. Realistic and pertinent forecasts about development can be drawn up for the planners. As at the end, time may be the most scarce resource of the LDCs, it is important to take advantage of the present situation, especially when it comes to close the knowledge gap.

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